REMARKS

Entry of the amendments is respectfully requested. Claims 3-29 and 41-64 have been amended and are pending in the application. Favorable reconsideration and allowance of this application is respectfully requested in light of the foregoing amendments and the remarks that follow.

1. Supplemental Information Disclosure Statement

Submitted herewith is a Supplemental Information Disclosure Statement to make of record a German published patent application that was cited in an *Invitation to Pay Additional Fees* document, dated April 24, 2003, in corresponding international PCT application No. PCT/US02/23529.

2. Rejection Under §112, Second Paragraph

Claims 3-29 and 41-64 stand rejected under 35 U.S.C. §112, ¶2, as being indefinite. In particular, claims 3-9, 15-16, and 41-64 are rejected because the sole designation of the microorganism is by an internal strain number. For administrative convenience, the strains P169 and P170 (as representative of strains P170, P179, P195, P261) will be deposited at ATCC at a future date. However, the applicants believe that the claims were definite as *originally* presented without the internal strain numbers because the patentee is allowed to be his or her own lexicographer. See *Fromson v. Advanced Offset Plate, Inc.*, 720 F.2d 1565, 1569, 219 USPQ 1137, 1140 (Fed. Cir. 1983).

In addition, claims 10-29 and 46-48 stand rejected because there was no claim designated step to ensure the various benefits, e.g., that the milk has more protein. Claims 10, 23, 41, 46, 48, and 57 have been amended to insert a step that requires testing of either (1) a milk produced by a first ruminant or (2) the first ruminant itself after it is fed the microorganism. The claims are further amended to require that the benefit be in respect to a second ruminant *not* fed the microorganism. Accordingly, the claims are believed to be definite.

Regarding the Examiner's questions beginning at the bottom of page 2 and continuing onto the top of page 3, all of the strains listed in the method claims have the same designated effects. That is, all of the strains having a group I profile after an *Xba* I digest of the genomic DNA, as is shown in Figures 1-2 and Table 3 of the patent application. The desired effect is obtained by feeding the animals the microorganism.

Claims 3 and 15 stand rejected for their recitation of "genetic equivalents." Claims 14 and 15 stand rejected for their recitation of "genetic equivalents thereof." Claims 3 and 15 have been amended to delete "genetic equivalents thereof" from these claims. Claim 14 does not contain either of these terms.

The term "genetic equivalent" is defined in the specification starting at page 10, line 16 to page 11, line 4 as

> "In a preferred embodiment, the microorganism is of the genus *Propionibacterium* and more preferably *P. acidipropionici* and *P. jensenii*. Preferred strains of bacteria include *P. acidipropionici* and *jensenii* strains P169, P170, P179, P195, and P261, especially strain, P169. . . . All of the preferred strains were found to have group 1 genomic profiles (as defined below). Therefore, other strains of *P. acidipropionici* or *P. jensenii* that have a group

> 1 genomic profile and which have a common identifying characteristic of successful performance in the present invention are also preferred strains. These other strains are referred to hereinafter as 'genetic equivalents.'"

Notably, these amendment do not narrow the scope of the claims since equivalence are available under the law.

Claims 10-29, 41-44, 46-48, 57-60, and 62-64 stand rejected as being indefinite for the use of words of degrees as a limitation such as "increased," "enhanced," "higher percent," and "substantially greater percent." The rejection of these claims as being indefinite is traversed because the specification provides various standards for measuring that degree. See *Seattle Box Co., Inc. v. Industrial Crating and Packing, Inc.*, 731 F.2d 818, 221 USPQ 568 (Fed. Cir. 1984). As in *Seattle Box*, the specification provides standards for measuring the claimed degree. For instance, Figure 10 of the patent application shows data related to the increase in energy balance.

Furthermore, as noted above, claims 10, 23, 41, 46, 48, and 57 have been amended to insert a step that requires testing of either (1) a milk produced by a first ruminant or (2) the first ruminant itself after it is fed the microorganism. The claims are further amended to require that the benefit be in respect to a second ruminant *not* fed the microorganism. Accordingly, the claims are believed to be definite.

In addition, the Office Action states that there is no clear indication of the nature and amount of bacteria to be fed to achieve the results as indicated. However, preferred amounts and conditions of the bacteria are indicated in the various dependent claims. For instance, claim 18 requires that the first ruminant be fed the microorganism such that the amount of microorganism delivered to the first ruminant is about 6 x 10^9 CFU to about 6

x 10^{12} CFU/animal/day. Also, claim 19 specifies that the first ruminant is fed the microorganism such that the amount of the microorganism delivered to the first ruminant is about 6 x 10^{11} CFU/animal/day. Therefore these dependent claims indicate preferred amounts of bacteria to be fed to the animals.

In addition, claim 21 requires that the first ruminant be fed 17 grams of a 1:10 mixture of the microorganism, which has been freeze-dried and which is at a concentration of about 3.5 x 10^{10} CFU/g, and a carrier on a daily basis. This claim provides preferred amounts of the microorganism to be fed and preferred nature of the microorganism, that is, freeze-dried and mixed with a carrier. Although these amounts and conditions of the bacteria do not limit the broader claims from which they depend, they do recite preferred amounts of the bacteria to be fed and preferred conditions of the bacteria. Therefore, there is a clear indication of the nature and the amount of the bacteria to be fed to achieve the results indicated.

In light of the foregoing and the amendments, withdrawal of the rejection of claims 3-29 and 41-64 under 35 U.S.C. § 112, ¶2 is requested.

3. Rejections Under 35 U.S.C. § 112, ¶ 1

Claims 3-9, 15, and 41-64 stand rejected under 35 U.S.C. § 112, ¶1 as not being enabled. The applicants traverse this rejection because the Examiner has not met her initial burden to establish a reasonable basis to question the enablement provided for the claimed invention. *In re Wright*, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513 (Fed. Cir.

1993) (examiner must provide a reasonable explanation as to why the scope of protection provided by a claim is not adequately enabled by the disclosure).

Furthermore, the disclosure as originally presented (without the accession numbers) is sufficiently enabling to allow one skilled in the art to make and use the invention without undue burden. The application specifically discloses that the microorganisms of the invention were isolated from the rumen of fistulated ruminants and were selected from the genus *Propionibacterium*. Multiple collections of ruminal fluid were obtained over a period of time. (page 9, lines 14-16). The application explains how the bacteria were isolated, grown, and the strains determined based on biochemical tests and carbohydrate fermentation patterns that are known in the art. (page 9, lines 17-21). The application then details how the intact genomic DNA from the isolates was evaluated. Pulsed-field gel electrophoresis analysis of genomic DNA identified 13 distinct *Xba* I fragment patterns. (p. 10, lines 7-10). The isolates were then tested for volatile fatty acid, and the isolates that produced the highest amount of propionate under conditions similar to the rumen were selected for animal testing. (page 10, lines 12-15). Identification of the propionibacteria isolates, genomic DNA analysis, and volatile fatty acid production is described in further detail in Example 1. These studies showed that strains P169, P170, P179, P195, and P261 were the highest propionate producing strains and that all of these strains had a Group I genotype.

Animal studies using strain P-169 are then detailed in Example 2. A second study of strain P-169 in ruminants is described in Example 3. In addition, preferred amounts of bacteria to be fed, conditions of the bacteria, e.g., freeze-dried, and timing of the feeding

are disclosed in the application. For administrative convenience, however, biological deposits will be made, as detailed above. Thus, it can be seen that the detailed description enables one skilled in the art to make and use the invention without undue experimentation.

4. Rejections of Claims 3-9 and 41-64 Based on the Prior Art

Claims 3-9 and 41-64 stand rejected under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) is obvious over Rehberger et al. (U.S. Patent No. 6,455,063). In addition, claims 3-9 and 41-64 stand rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) is obvious over Ott et al. (U.S. Patent No. 5,139,777).

a. The Rehberger et al. Patent

The Rehberger et al. patent discloses a propionibacteria strain P-63 for use in a direct fed microbial for animal feeds to reduce acidosis. Acidosis is a metabolic condition, characterized by an increase in hydrogen ion concentration that occurs when the body is no longer able to buffer free hydrogen ions in the blood. This usually causes the pH of the blood to drop (and become more acidic). Propionibacterium P-63 is a culture of the species *Propionibacterium jensenii*. (col. 4, lines 4-5). Strain P-63 was found to demonstrate superior anti-acidosis properties as compared to other lactate utilizing bacteria. (col. 4, lines 18-20). The P-63 strain was obtained from the

Communicable Disease Laboratory in Atlanta, Georgia under the strain designation number PJ54. (col. 4, lines 4-7).

b. The Ott et al. Patent

The Ott et al. patent describes a composition and a method for improving the efficiency of ruminant feed utilization. In the Ott et al. patent, microorganisms were isolated from the rumen of sheep, as is detailed in Example 1 thereof. Isolated microorganisms were screened and several bacteria were assigned to the *Propionibacterium* genus. (col. 4, lines 59-63). Propionibacteria isolated by Ott et al. included strains Hh-GYOKI-1-123Sz, Hh-GYOKI-48a, which originated from Hh-GYOKI-1-123. (col. 4, lines 59-63).

Example 4 of the Ott et al. patent describes in vitro studies performed on various isolates, including Hh-GYOKI-1-123Sz and Hh-GYOKI-48a. From the in vitro studies, Ott et al. concluded that production of propionic acid can be significantly stimulated with a culture prepared from strain Hh-GYOKI-48a.

Example 5 of the Ott et al. patent describes bacterial preparation for oral administration to sheep. Ott et al. state that bacterial strain(s) be chosen from the microorganisms, prepared by the process of the invention to modify the rumen flora of the sheep. Ott et al. further state that if a decrease of acetic acid to propionic acid ratio is required, they may use, e.g., a culture prepared from strain Hh-GYOKI-48a.

Example 6 of the Ott et al. patent describes the effects of administering strains Hh-GYOKI-48a and Hh-GYOKI-1-123Sz to sheep. They found that sheep treated with

strains Hh-GYOKI-1-123Sz and Hh-GYOKI-48a and the control group gained on a poor ration in average 2620, 3875 and 360 g, respectively, during the 35-day experimental period. Initial body weights did not differ significantly between groups, but significant differences were found in the final body weights (Table 11) and in the daily gains (Table 12).

c. §102 Rejections

Claim 3 recites a method of feeding a ruminant a microorganism comprising a propionibacteria strain selected from a group consisting of P169, P170, P179, P195, and P261. All of these strains were isolated from a rumen of a cow and had a group 1 profile produced by an *Xba* I digest of bacterial genomic DNA, as shown in Figs. 1-2 and Table 3.

As is detailed above, the Rehberger et al. patent discloses various strains of propionibacteria, including P-63, which is useful in reducing acidosis. Unlike the strains listed in claim 3, P-63 was not isolated from a cow rumen. Instead, P-63 was an isolate obtained from the Communicable Disease Laboratory in Atlanta, Georgia. Furthermore, genetic testing done by applicant Rehberger (also of the Rehberger et al. patent) on the strains listed in the Rehberger et al. patent found that the strains listed in the Rehberger et al. patent did *not* have a group 1 profile produced by an *Xba* I digest of bacterial genomic DNA. Hence, the Rehberger et al. patent does not anticipate the invention recited in claim 3.

Likewise, the Ott et al. patent, although disclosing two propionibacteria strains, does not anticipate claim 3. The strains disclosed in the Ott et al. patent were isolated from sheep. In contrast, the strains listed in claim 3 were isolated from cows. As such, these two sets of strains would be expected to differ. Thus, the invention recited in claim 3 and the claims that depend therefrom are believed to patentably define over the Ott et al. patent.

Claim 10 recites a method of feeding a first ruminant a microorganism of the genus *Propionibacterium*. Claim 10 requires the feeding of the microorganism to result in an increase in at least one of energy balance, plasma non-esterified fatty acids levels, and plasma leptin level in the first ruminant when compared to a second ruminant not fed the microorganism.

Neither Rehberger et al. or Ott et al. is seen to show or suggest the method of claim 10. The propionibacteria strains in both Rehberger et al. and Ott et al. were never shown to have the same effects as those recited in claim 10. Instead, the propionibacteria of the references of record had different effects than the claimed effects. The strains in Rehberger et al. were shown to reduce acidosis. The strains in Ott et al. were shown to have effects on final body weights and in the daily gains in sheep. The energy balance, plasma non-esterified fatty acids levels, and plasma leptin level were never tested in either of the references of record. Consequently, the invention recited in claim 10 and the claims that depend therefrom are believed to patentably define over the references of record.

Claim 23 recites a method of enhancing the protein content of milk produced by a first ruminant. Claim 23 requires a microorganism of the genus *Propionibacterium* to be fed to the first ruminant. Claim 23 calls for the first ruminant to be milked. Claim 23 further calls for a percent of protein in a milk produced after the first ruminant is fed the microorganism to be determined. Claim 23 further specifies that the percent of protein in the milk produced by the first ruminant be greater than the percent of protein in a milk produced by a second ruminant not fed the microorganism.

Neither of the references of record examined milk produced by the animals fed the propionibacteria strains. Therefore, neither of the references of record are seen to anticipate claim 23, nor the claims that depend therefrom.

Claim 49 recites a method of feeding a first ruminant a microorganism comprising a propionibacteria strain having a group 1 profile produced by *Xba* I digests of genomic DNA as shown in Figures 1-2 and Table 3. As is noted above, *Xba* I digests have been performed on the propionibacteria strains described in the Rehberger et al. patent and none of those examined were found to have a group 1 profile. In addition, the two propionibacteria stains discloses in the Ott et al. patent would not be expected to have a group 1 profile after *Xba* I digestion. Accordingly, the method recited in claim 49 is believed to define over the references of record. The claims that depend from claim 49 are also believed to be allowable.

The Examiner contends that the claimed effects on milk productivity and other benefits are ***inherent*** in the process of feeding certain propionibacteria strains. In order for something to be inherent, the patent law requires that "if an element is not expressly

disclosed in a prior art reference, the reference would still be deemed to anticipate the subsequent claim if the missing element 'is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.'" Rosco, Inc. v. Mirror Lite, Co., 64 USPQ2d 1676, 1680 (Fed. Cir. 2002) (quoting Continental Can Co. v. Monsanto Co, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991)). "'Inherent anticipation requires that the missing descriptive materials is necessarily present, not merely probable or possibly present, in the prior art.'" *Rosco*, 64 USPQ2d at 1680 (quoting *Trintec Indus., Inc. v. Top-U.S.A. Corp.*, 63 USPQ2d 1597, 1599 (Fed. Cir. 2002)).

Here, one skilled in the art reading either the Rehberger et al. patent or the Ott et al. patent would not read it as showing the claimed invention. As noted above, the Rehberger et al. patent discloses a method of reducing acidosis in cattle. There is nothing in the Rehberger et al. patent that would indicate that the missing elements were inherent. For example, there is no discussion of the effects of a propionibacteria strain on milk. Similarly, the Ott et al. patent does not inherently disclose the claimed method.

Moreover, even the strains isolated in the instant invention had to be screened, classified, and tested before a useful method was found. To contend that the claimed effects on milk productivity and other benefits are inherent in the process of feeding certain propionibacteria strains and therefore not patentable would mean that, e.g., a method of treating cancer with a compound was not patentable because the claimed effect was inherent in the compound. Clearly, patent protection is available to such inventions.

In light of the foregoing, withdrawal of the rejection of claims 3-29 and 41-64 is respectfully requested.

d. The §103 Rejections

The rejection of claims 3-9 and 41-64 as unpatentable over Rehberger et al. and Ott et al. is respectfully traversed. The mere fact that Rehberger et al. discloses a method in which a propionibacteria strain is fed to cattle to inhibit acidosis does not make obvious applicants' discovery of a method of feeding propionibacteria strains, which are different from those of Rehberger et al. Similarly, the mere fact that Ott et al. discloses a method in which a propionibacteria strain that was isolated from a sheep rumen and then fed to sheep to have effects on final body weights and daily gains does not make obvious applicants' discovery of a method of feeding different propionibacteria strains, which are different from those of Ott et al.

The fact that a claimed species is encompassed by a prior art genus is not sufficient by itself to establish a *prima facie* case of obviousness. *In re Baird*, 16 F.3d 380, 382, 29 USPQ2d 1550, 1552 (Fed. Cir. 1994). Rather, to establish a *prima facie* case of obviousness in a genus-species situation, as in any other 35 U.S.C. 103 case, it is essential that the examiner find some motivation or suggestion to make the claimed invention in light of the prior art teachings. See, e.g., *In re Brouwer*, 77 F.3d 422, 425, 37 USPQ2d 1663, 1666 (Fed. Cir. 1996). In order to find such motivation or suggestion there should be a reasonable likelihood that the claimed invention would have the properties disclosed by the prior art teachings. See, e.g., *In re Vaeck*, 20 USPQ2d 1438,

1442 (Fed. Cir. 1991) (A proper obviousness analysis requires consideration of "whether the prior art would also have revealed that in so making or carrying out [the claimed invention], those of ordinary skill would have a reasonable expectation of success."). See also MPEP 2144.08.

In this case, there is no such motivation or suggestion to produce the claimed invention due, *inter alia*, to the unpredictability of the technology and the number of species encompassed by the genus--points not addressed by the examiner. Instead of making, or even attempting to make, a *prima facie* case of obviousness under the requisites of the MPEP, the examiner clearly relies upon the discredited "obvious-to-try" standard.

In re O'Farrell, 7 USPQ2d 1673 (Fed. Cir. 1988), outlines when an invention is obvious, and therefore unpatentable, versus when an invention is obvious-to-try, and therefore patentable. The Court noted two instances in which a claimed invention is only obvious-to-try, both of which are relevant to the present rejection. First, an invention is merely obvious-to-try (and therefore patentable) if it is necessary to try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave no direction as to which of many possible choices is likely to be successful." 7 USPQ2d at 1681, (citations omitted). Second, an invention is merely obvious-to-try (and therefore patentable) where the prior art gives only general guidance as to the particular form of the claimed invention or how to achieve it. Both of these situations apply here.

With respect to the first scenario, both Rehberger et al. and Ott et al. fail to provide any direction as to which of many possible choices of propionibacteria strains

would likely be useful in the claimed methods. No direction is given as to how to identify propionibacteria strains that would be useful in the claimed methods. For example, both Rehberger et al. and Ott et al. fail to provide screening assays comparing one propionibacteria strain to another for their effects on, e.g., energy balance, plasma non-esterified fatty acids levels, and plasma leptin level in the first ruminant when compared to a second ruminant not fed the microorganism. Instead, in Rehberger et al. there are only screening assays for determining the effect of various propionibacteria strains on H+ accumulation. This is because the Rehberger et al. patent was only concerned with reducing acidosis.

Likewise, in Ott et al. there are only comparisons of propionate to acetate ratios, final body weights, and daily gains in sheep. Consequently, the teachings of Rehberger et al. and Ott et al. fail to provide any meaningful guidance with respect to the presently claimed invention.

Because both Rehberger et al. and Ott et al. failed to provide any direction on which of the many possible choices of Propionibacteria strains would produce a successful result, the applicants had to develop a screening method to determine which strains would be useful. Moreover, when the applicants themselves tested numerous possible choices of Propionibacteria strains, which were subdivided into thirteen different profiles upon *Xba* I digestion, it was found that only bacteria having one of the profiles (group 1) produced the desired volatile fatty acid production. This is tangible evidence of non-obviousness. See MPEP 2144.08(A)(4)(e) (If the technology is unpredictable, it is

less likely that structurally similar species will render a claimed species obvious because it may not be reasonable to infer that they would share similar properties.).

With respect to the second scenario, both Rehberger et al. and Ott et al. only provide the most general guidance, if any, as to how to achieve the presently claimed invention. For instance, Rehberger et al. notes that propionibacteria strains can be fed to cattle to reduce acidosis. Ott et al. shows that propionibacteria strains can be fed to sheep. As is detailed above, much more than this general guidance was necessary to arrive at the claimed invention.

In light of the foregoing, withdrawal of the rejection of claims 3-9 and 41-64 is respectfully requested.

CONCLUSION

It is submitted that original claims 3-29 and 41-64 are in compliance with 35 U.S.C. §§ 112, 102, and 103 and each define patentable subject matter. A Notice of Allowance is therefore respectfully requested.

Enclosed is a check for $465 for payment of the fee for a 3-month extension of time. No additional fee is believed to be payable with this communication. Nevertheless, should the Examiner consider any other fees to be payable in conjunction with this or any future communication, the Director is authorized to direct payment of such fees, or credit any overpayment to Deposit Account No. 50-1170.

The Examiner is invited to contact the undersigned by telephone if it would help expedite matters.

Respectfully submitted,

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